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MAGNETIC X-RAY DICHROISM IN ULTRATHIN EPITAXIAL FILMS

J.G. Tobin, K.W. Goodman, E. Tamura, P.A. Sterne
Lawrence Livermore National Laboatory, Livermore, CA
G.D. Waddill,
University of Missouri- Rolla, Rolla, MO
X. Guo, S.Y. Tong,
Univerity of Wisconsin, Milwaukee, WI
J. Gammon, D.P. Pappas,
Virginia Commonwealth University, Richmond, VA
F.O. Schumann, S. Wu, G. Mankey, R.F. Willis
Pennsylvania State University, University Park, PA
R. Carr
Stanford Synchrotron Radiation Laboratory, Stanford, CA
J.D. Denlinger, E. Rotenberg, A. Warwick, J. Kortright, and N.V. Smith
Advanced Light Source, LBL, Berkeley, CA

We have used Magnetic Xray Linear Dichroism (MXLD) and Magnetic Xray Circular Dichroism (MXCD) to study the magnetic properties of epitaxial overlayers in an elementally specific fashion. Both MXLD and MXCD Photoelectron Spectroscopy were performed in a high resolution mode at the Spectromicroscopy Facility of the ALS. Circular Polarization was obtained via the utilization of a novel phase retarder (soft xray quarter wave plate) based upon transmission through a multilayer film. Our samples were low temperature Fe overlayers, magnetic alloy films of NiFe and CoNi, and Gd grown on Y. Our results include a direct comparison of high resolution angle resolved Photoelectron Spectroscopy performed in MXLD and MXCD modes as well as measurement of the concentration dependent variation of the elementally specific magnetic moments in the magnetic alloy ultrathin films. The MXCD and MXLD Photoemission measurements are further supplemented by MXCD Absorption performed at the Stanford Synchrotron Radiation Laboratory, using the University of California/ National Laboratory SGM beamline and the Elliptically Polarizing Undulator (EPU).

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